> *rendering potentially beneficial modifications impossible. We will therefore authorize involuntary modifications....*[181/]

Since then, only a handful of involuntary modification applications pursuant to Section 74.986 have been filed and, to the best of the Petitioners' knowledge, those have all either resulted in settlements among the parties or remain pending. Given that the Commission has apparently never denied an involuntary modification application, it is specious to suggest that the mechanism either has been abused or will be abused upon implementation of two-way digital services.

Indeed, retention of Section 74.986 is essential to limiting the ability of any one ITFS licensee in a given market from unreasonably preventing other ITFS and MDS licensees in that market from taking advantage of advanced technologies. It must be stressed that the Petitioners firmly believe no ITFS licensee should be required to cellularize, use its channels for return paths, or engage in superchannelization or subchannelization.[182/] By the same token, however, no licensee should be permitted to stand in the way of the introduction of advanced technologies by its neighbors when modifications of the sort permitted under Section 74.986 can eliminate interference when mandated by the Commission.[183/]

[181/] *90-54 Second Report and Order*, 6 FCC Rcd at 6796-97 (emphasis added).

[182/] *See, e.g.*, Petitioners' Reply Comments, at 21.

[183/] *See* 47 C.F.R. §§ 74.903(a)(2).

G. The Commission Should Declare That Licensees Can Employ QPSK And CDMA On The Same Terms And Subject To The Same Conditions Applicable To VSB And QAM.

The *NPRM* seeks comment on "whether there is a basis for concluding that use of particular modulation types by MDS and ITFS stations other than VSB and QAM would not be prone to interference, based on the current 45 dB/0 dB protection ratios for cochannel and adjacent channel interference respectively, *i.e.* that such modulation formats should be permitted without requiring test data."[184/] The Petitioners believe there is.

On December 2, 1997, ADC Telecommunications Corp., ATI, CAI and PCTV, all of whom are Petitioners, submitted a Petition for Declaratory Ruling requesting that the Mass Media Bureau expand the Commission's July 10, 1996 *Digital Declaratory Ruling,* which established policies to govern the use of Quadrature Amplitude Modulation ("QAM") and Vestigial Sideband ("VSB") digital modulation by MDS and ITFS licensees,[185/] to permit the routine authorization of and deployment of CDMA and QPSK modulation (the "QPSK/CDMA Petition").

With the *Digital Declaratory Ruling,* wireless cable became the first over-the-air, terrestrial video programming service authorized by the Commission to use digital transmissions. This

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[184/] *NPRM*, at ¶ 30.

[185/] *Digital Declaratory Ruling,* 11 FCC Rcd 18839. The *Digital Declaratory Ruling* provides an interim framework under which the Commission may routinely grant MDS and ITFS applications proposing the use of digital transmissions with modulation densities of up to 64-QAM and 8-VSB subject to compliance with the current 45 dB cochannel and 0 dB adjacent-channel desired-to-undesired ("D/U") interference protection ratios found at Sections 21.902(b) and 74.903(a) of the Rules, pending the development of permanent rules for digital operations. The interim policies and rules set out in the *Digital Declaratory Ruling* also provide for waiver of the emissions limitations of Sections 21.908(b) and 74.936(b), the uniform use of average power values for digital transmissions, blanket waivers to permit operation at reduced power upon conversion to digital technology and safeguards to ensure uniform power spectral density across the digital channel. Finally, the Commission has deemed applications for digital authority to be minor changes and has waived the thirty-day public notice period to expedite the introduction of digital technology for wireless cable under the interim authority set out in the *Digital Declaratory Ruling.*

development has paved the way for the industry's successful deployment of digital technology for video and non-video services alike,[186] promoting competition in the telecommunications marketplace in fulfillment of the objective of the Telecommunications Act of 1996.[187] Grant of the QPSK/CDMA Petition will permit MDS and ITFS licensees to employ two additional digital modulation schemes, allowing them to offer services that cannot be efficiently provided using QAM or VSB and to better compete in the telecommunications marketplace.

While only two modulation formats, QAM and VSB, were authorized in the *Digital Declaratory Ruling*, the Commission took pains to note that it had not adopted a "standard" digital technology.[188] Rather, the Commission only authorized those two types of digital modulation because the test data initially submitted to establish that the current MDS and ITFS interference protection standards could be employed to allow the use of digital modulation without harm to incumbent licensees, was limited to QAM and VSB.[189] However, the *Digital Declaratory Ruling* clearly left the door open to the use of additional modulation types if supported by adequate

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[186] *See supra* notes 9-11. *See also* "The Mass Media Bureau Implements Policy for Provision of Internet Service on MDS and Leased ITFS Frequencies," *Public Notice*, DA 96-1720 (rel. Oct. 17, 1996); "For MMDS, Data Is Make Or Break," *Multichannel News*, at 51 (July 30, 1997); "High-Speed Data Center of Attention at MMDS Show," *Cable World*, at 18 (July 30, 1997).

[187] *See Digital Declaratory Ruling*, 11 FCC Rcd at 18840.

[188] *See id.* at 18848-49.

[189] *See id.* at 18851, 18853.

technical showings.[190] The Commission specifically deferred consideration of the adoption of other modulation technologies, noting:

> We will consider future requests for declaratory ruling where the requesters can demonstrate that their proposals satisfy MDS and ITFS technical rules or adequately support waivers of those rules. In particular, requesters would need to show that other modulation techniques could be used in a manner that would not interfere with MDS and ITFS analog and digital operations.[191]

The QPSK/CDMA Petition supplies the necessary technical showings to support the routine authorization of CDMA and QPSK employing the same interim procedures as have been adopted for QAM and VSB. Thus, the Petitioners urge the Commission to expeditiously grant the QPSK/CDMA Petition and declare that QPSK and CDMA can be applied for and deployed under the same terms and subject to the same conditions established in the *Digital Declaratory Ruling* for QAM and VSB.

H. The Commission Should Provide MDS And ITFS Licensees Flexibility To Readily Alternate Among Common Carrier And Non-Common Carrier Services.

As the *NPRM* acknowledged, the Commission has always permitted MDS channels to be employed for the provision of "any kind of communications service."[192] Although the Commission has long afforded each MDS licensee the flexibility to provide service as either a common carrier

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[190] *See id.* at 18865 and n. 69.

[191] *See id.* at 18848 n. 31.

[192] *See NPRM*, at ¶ 8, *citing* 47 C.F.R. § 21.903(b).

or a non-common carrier,[193/] the Commission has required each MDS licensee to choose to operate each channel solely as a common carrier or as a non-common carrier, and has not established procedures by which a given channel can be employed for both common carrier and non-common carrier offerings.[194/] Similarly, the Commission has also afforded ITFS licensees who choose to lease excess capacity on their main channels or subsidiary channels the flexibility to decide whether or not to operate as a common carrier, although the rules governing how such an election is to be made are not entirely clear.[195/]

The current regulatory scheme regarding status election for MDS and ITFS licensees is likely to prove problematic as the Commission amends its rules to provide those licensees the technical flexibility to offer an increasingly wide array of services. In the *LMDS Second Report & Order*, which was released just the day prior to the filing of the Petition, the Commission stated that:

> We also decline to require an applicant to choose between either common carrier or non-common carrier status in providing services under the broad license to be issued. We find it is inconsistent with the broad service definition and the flexible operations we adopt for LMDS to require the licensee to forgo one category of service for the other category. Licensees may well provide services that include elements of both common carrier and non-common carrier services. Instead, we will permit LMDS to be licensed to allow both common carrier and non-common carrier services in a single license. Thus, under our framework an applicant may request both common carrier and non-common carrier status in the same application, which will result in the issuance of both authorizations in a single license. The licensee will be able to

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[193/] *See LMDS Second Report and Order,* 12 FCC Rcd at 12634-35, 12636, 12644. *citing Revisions to Part 21 of the Commission's Rules Regarding the Multipoint Distribution Service*, 2 FCC Rcd 4251, 4251-53 (1987)[hereinafter cited as "*MDS Status Election Order*"].

[194/] *See MDS Status Election Order*, 2 FCC Rcd at 4252 ("an MDS licensee may elect a different status for each particular channel for which it is licensed").

[195/] *Gen. Docket No. 80-112 Report and Order*, 94 F.C.C.2d at 1250-55.

> provide all LMDS services anywhere within its licensed area at any time, consistent with the statutory and regulatory requirements that are imposed on the respective operations. It is the licensee's obligation to maintain the various operations in compliance with the requirements.[196/]

As the *NPRM* acknowledges, the Petitioners have proposed a similar approach for MDS and ITFS licensees, one which permits a license to switch from common carrier to non-common carrier service and back without seeking subsequent authorization from the Commission.[197/] Particularly since none of the parties commenting in response to the *Public Notice* have objected to the Petitioners' proposal, the Petitioners continue to advocate this relatively simple, flexible approach. It not only reduces the regulatory burden on licenses and enhances the ability of operators to rapidly respond to marketplace demand but, as the Commission recognized just two months ago when it gave licensees in the 39 GHz band flexibility to provide both common carrier and private services,

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[196/] *LMDS Second R&O*, 12 FCC Rcd at 12644-45 (1997).

[197/] *See NPRM*, at ¶ 57. Although not specifically addressed in the *NPRM,* the Petitioners propose that the Commission allow an MDS or ITFS licensee to freely offer common carrier and/or non-common carrier services on any given channel without specific approval, once the licensee has secured authorization from the Commission to offer both types of services. An applicant for a new facility would specify whether it proposes to take advantage of such flexibility. In the case of an existing MDS common carrier, the licensee should be required to comply with the procedures set forth in Section 21.910 of the Commission's Rules the first time it proposes to engage in non-common carrier offerings in whole or in part. In the case of an existing MDS non-common carriers or ITFS licensee (none of whom are known to have secured common carrier status), they should be required merely to file applications proposing to convert to common carrier status or to provide both common carrier and non-common carrier service offerings. Of course, no licensee should be permitted to avoid its obligations under an existing, enforceable non-common carrier contract by converting to common carrier status. The Petitioners propose that such applications be processed under the expedited provisions of Section 21.42 (in the case of an MDS station) or Section 74.911(a)(2) (in the case of an ITFS station). In this manner, licensees who desire to provide a mixture of common carrier and non-common carrier services will be required to secure an appropriate authorization just once, and the process for securing that authorization will be only minimally intrusive.

it "will promote economic efficiencies by reducing construction and operating costs associated with having to provide separate facilities."[198/]

The *NPRM* seeks comment on whether a licensee should be required to provide the Commission with notice each time it alternates between common carrier and non-common carrier service.[199/] The Petitioners do not believe that such a notice requirement should be imposed. As with LMDS, it is likely that wireless cable systems will provide a panoply of services that include elements of common carrier and non-common carrier services. Because licensees will employ various multiplexing and antenna sectorization techniques to maximize spectral efficiency, it is certainly possible that both common carrier and non-common carrier services will be provided over a single 6 MHz channel either simultaneously or in rapid sequence. To cite just a few of many possible examples, a single 6 MHz channel could be used to provide both a private, non-common carrier high-speed data line and a common carrier telephony service at the same time. Or, that channel may be used dynamically to provide either private high-speed data lines or common carrier telephony services, depending upon the demand at any particular moment. Or, that same channel might be used for a business-oriented common carrier telecommunications service during business hours, but devoted to non-common carrier pay-per-view movies during evening and weekend hours when the demand for the common carrier telecommunications service slackens. As these examples illustrate, whatever benefit may be derived by the proposed notification (and the *NPRM* does not identify any anticipated benefit from the proposed notification requirement), that benefit is

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[198/] *39 GHz Order*, at ¶ 76.

[199/] *See NPRM*, at ¶ 57.

outweighed by the impracticality of requiring the constant submission of notifications to the Commission as uses change.

I. The Commission Should Adopt RF Emission Rules For MDS/ITFS Return Paths Similar To Those Adopted For LMDS.

The Petitioners are also pleased that the Commission has proposed to adopt their suggested rules governing radio frequency ("RF") emissions requirements associated with MDS and ITFS return path equipment.[200/]

As the Petitioners noted in their Comments in response to the *Public Notice*, the Commission's *LMDS Second Report & Order* adopted RF emissions requirements relating to LMDS transmissions. The Commission ruled that "because of the technical similarities between LMDS and MDS, we are requiring LMDS licensees to follow the RF radiation guidelines and procedures that apply to MDS systems."[201/] Accordingly, the Commission amended Section 1.1307 of the Rules to provide that, like MDS and ITFS stations, LMDS stations are required to perform routine environmental evaluations if: (a) the transmitting antenna is not rooftop mounted, its height above ground is less than 10 meters and the station's total power is greater than 1,640 Watts EIRP; or (b) if the facility is roof mounted and the power is greater than 1,640 Watts EIRP.[202/]

[200/] *See NPRM*, at ¶ 27.

[201/] *LMDS Second Report & Order*, 12 FCC Rcd at 12699.

[202/] *See id.*

The Commission recognized, however, that "subscriber transceiver antennas present a unique situation."[203/] The Commission determined that:

> Since the Commission has not specifically addressed RF emissions guidelines for this kind of equipment, we believe that requiring licensees to provide user and installation information, and to label subscriber antennas properly, provides adequate notice regarding the potential safety hazards of LMDS subscriber transceivers. We will therefore require LMDS licensees to attach labels to every antenna, in a conspicuous fashion. Such labels should include reference to the Commission guidelines that apply. In addition, we expect LMDS licensees to include a full explanation of the labels that appear on their antennas, as well as reference to the applicable Commission guidelines in the instruction manuals and other information accompanying their subscriber transceivers. For example, this information should include advice as to minimum separation distances required between users and radiating antennas to meet the Commission's exposure guidelines. While we will require LMDS licensees to attach labels and provide users with notice of radiation hazards, we will not mandate the specific language to be used. However, we will require use of the ANSI-specified warning symbol for RF exposure.[204/]

To effectuate that discussion, the Commission further amended Section 1.1307 of the rules to provide that:

> LMDS licensees are required to attach a label to subscriber transceiver antennas that (1) provides adequate notice regarding potential radio frequency safety hazards, *e.g.*, information regarding the safe minimum separation distance required between users and transceiver antennas; and (2) references the applicable FCC radio frequency emission guidelines contained in FCC OST Bulletin 65, 2d Edition.[205/]

The Petitioners agree with the *NPRM's* proposal that, given the similarity between LMDS and MDS/ITFS return path operations, similar language should be added to the provisions of Section 1.1307 that address the MDS and ITFS services.

[203/] *Id.*

[204/] *Id.* at 12670.

[205/] 47 C.F.R. § 1.1307(b)(1) table 1; *id.*

J. The Call Sign Requirements Of Section 74.982 Should Be Eliminated.

The *NPRM* solicits comments on whether the Commission should continue to require the transmission of call signs by ITFS licensees.[206] In the Petitioners' view, continued enforcement of Section 74.982 will impose a substantial burden on ITFS licensees and wireless cable system operators in an environment where ITFS systems will increasingly feature cellular transmission system designs and return path technology.

The cost of equipment to generate call sign identifications and insert those identifications into signals emanating from a multitude of originating transmission sites is staggering. Moreover, it does little to advance the public interest. In the *Digital Declaratory Ruling*, the Commission carefully reviewed the objectives of the call sign requirement, and that discussion need not be repeated here. Suffice it to say that the Commission was absolutely correct when it recognized in the *Digital Declaratory Ruling* that "the burdens of requiring ITFS licensees to transmit call signs may outweigh the benefits, especially where the channels are leased to a wireless cable operator, whose identity is readily discernible and whose licensing status is readily ascertainable."[207] The Commission has generally recognized that where the identity of a licensee can be readily ascertained, a call sign transmission requirement is unnecessary.[208] Because the *NPRM* proposes a regulatory regime under

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[206] *See NPRM*, at ¶ 89.

[207] *Digital Declaratory Ruling*, 11 FCC Rcd at 18868. Moreover, because the call sign will generally be transmitted over an addressed, digitally compressed channel, it will be virtually impossible for any non-subscriber to the system to view the call sign in intelligible form.

[208] *See, e.g., CMRS Third Report and Order*, 9 FCC Rcd at 8089; 47 C.F.R. § 95.835 (exempting IVDS licensees from call sign transmission obligations); 47 C.F.R. § 22.313(a)(exempting cellular radiotelephone service licensees, general aviation ground stations

which the Commission's records will reflect who is transmitting on what channels at all times, the burdens of the current call sign requirement far outweigh the benefits.

K. The Rules Governing The 125 kHz Response Channels Should Be Revised As Proposed In The NPRM To Provide Greater Flexibility.

As is discussed in detail in the Petition, Parts 21 and 74 of the Commission's Rules currently provide for a group of 125 kHz wide MDS/ITFS channels in the spectrum from 2686 MHz to 2690 MHz that are available to the licensees of all ITFS channels and to the licensees of MDS channels E1, E2, F1 and F2.[209/] The Petition proposes that the rules governing those 125 kHz channels be substantially revised to provide, among other things, procedures for the licensing of those channels, technical rules governing the operation of those channels, and the provision of interference protection to operations on those channels, all contemplating that the 125 kHz channels would be used for return paths. In addition, in their Comments in response to the *Public Notice*, the Petitioners proposed that the Commission revise its rules to permit the use of those channels for communications to subscribers. The Petitioners are thus pleased that the *NPRM* proposes to adopt their proposed new rules for governing the 125 kHz channels.[210/]

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in the Air-ground Radiotelephone Service, rural subscriber stations using meteor burst propagation mode communications in the Rural Radiotelephone service, rural subscriber stations using Basic Exchange Telephone Radio Systems in the Rural Radiotelephone Service and nationwide network paging stations operating on 931 MHz channels from call sign transmission requirements).

[209/] *See, e.g.*, Petition, at 24-25.

[210/] *See NPRM*, at ¶ 60.

As such, the Petitioners vehemently oppose the suggestion by CTN that all of the 125 kHz channels be available solely for ITFS licensees, and solely for upstream transmissions.[211/] CTN has provided absolutely no explanation as to why the 125 kHz channels currently allocated to MDS, the rights to which were auctioned by the Commission, should be reallocated for exclusive use by ITFS licensees.[212/] Nor is there any discussion by CTN either of how the auction winner is to be recompensed, or how the MDS response channels would be assigned among ITFS licensees. Nor has CTN explained why licensees should be barred from using 125 kHz channels for downstream transmissions. Absent any justification for these proposals, they should be rejected.

L. The Commission Should Adopt Appropriate Rules To Govern The Means For Measuring Compliance With The Spectral Mask

In the *NPRM*, the Commission has sought "comment on the means for measuring compliance with the spectral mask requirements, including the appropriate resolution bandwidth(s)."[213/] The *NPRM* proposes to adopt for 6 MHz channels the spectral mask structure adopted in the *Digital Declaratory Ruling* and followed consistently since, namely, 38 dB attenuation at the channel edges and 60 dB attenuation at points removed 3 MHz from the channel edges and beyond.[214/] For the 125 kHz channels, the *NPRM* proposes to adopt the values specified in the Petition, *i.e.*, 35 dB at the

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[211/] *See* CTN Request, at 4.

[212/] Even with the four 125 kHz response channels allocated to MDS, CTN's proposal would not leave adequate response capacity for most ITFS licensees.

[213/] *See NPRM*, at ¶ 23.

[214/] *See Digital Declaratory Ruling*, 11 FCC Rcd at 18852.

channel edges and 60 dB attenuation at points removed 125 kHz from the channel edges and beyond, with certain exceptions for discrete spurious signals.[215/]

In response to the proposals advanced in the Petition, the *NPRM* proposes to permit subchannelization and superchannelization of ITFS and MDS operations, resulting in occupied bandwidths of various transmitters that will range from fractional MHz to many MHz. The fact that a multitude of different bandwidths will be usable upon adoption of the *NPRM* makes the specification of a single resolution bandwidth for all spectral mask measurements problematic at best. This results from the ways in which the filter responses of the instruments used to measure the spectral mask will overlay the edges of the channels as the measurements are being made and also from the fact that different types of filters are used in different types of instruments. A more pragmatic approach to resolution bandwidth will be to specify the relationships of signal levels that are to be demonstrated and the ways in which they are to be related mathematically, while leaving to the licensee the choice of the actual resolution bandwidth to be used to demonstrate compliance.

An example illustrates why no single approach is appropriate in all cases. Take the case of a single unmodulated carrier placed in the middle of a 125 kHz channel, and measure its compliance with the spectral mask using two different spectrum analysis instruments. One is an ordinary spectrum analyzer that has a 100 kHz resolution bandwidth at the 3 dB points, is 4.1 dB down at 125 kHz bandwidth, and 28.5 dB down at 500 kHz bandwidth. The other is a signal analyzer based on use of a Fast Fourier Transform ("FFT") that has a 100 kHz bandwidth at the 3 dB points, is 6.8 dB down at 125 kHz bandwidth, and is 68 dB down at 250 kHz bandwidth. In measuring the carrier, the

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[215/] *See NPRM*, at ¶ 22.

FFT-based device will show that it is down nearly 7 dB at the channel edge and substantially more than 70 dB (actually in the noise of the instrument) at the far edge of the adjacent channel (187.5 kHz away). The spectrum analyzer will show that it is only 4.1 dB down at the channel edge and only 21.1 dB down one channel away. If the spectrum analyzer were operated with a resolution bandwidth of 10 kHz, it would show the carrier as being 58 dB down at the channel edge and almost 80 dB down (actually in the noise of the instrument) one channel away. (These numbers are based on tests of real instruments.) Of course, if modulated signals had been used in the example instead of the unmodulated carrier, no matter what their actual signal levels at the various specified spectral points, they would have measured as exceeding the specified values just as the carrier did.

Both the spectrum analyzer and the FFT-based instrument represent reasonable approaches to determining the spectral characteristics of a signal, yet they yield significantly different measurements unless they are operated in ways that take into account their particular attributes. This is especially so when different signal bandwidths are involved. Specification of the resolution bandwidth to be used in making measurements is one form of constraint that may lead to incorrect results and that certainly will cause unnecessary time and effort to be spent trying to make equipment perform so as to meet the requirements of the rules, possibly at the expense of efficient use of the spectrum.

Consequently, it is proposed that a method of measurement be specified that takes into account the resolution bandwidth used, but leaves the choice of resolution bandwidth *per se* to the operator of the instrument used to make the measurement. The method would recognize that the power in the signal itself could be determined either with the same instrument used to measure the

spectral performance of the signal or by completely separate means. If a separate instrument were used, it would have to be calibrated to measure the average power in the signal across the entire channel(s) or portions occupied by the signal. If the same instrument were employed, the resolution bandwidth used to determine the average power in the signal would have to be included in the calculation.

It should be recognized that the method used for determining the attenuation in the skirts and at the baseline of signals tested to establish the proposed spectral mask applied the same resolution bandwidth to the both the power measurement and the attenuation measurement so that the result measured the separation between the "flat top" of the signal and the spectral point under consideration. Thus there was an assumed factor applied to the average power measurement that also applied to the attenuation measurement and that was the same for each because of the use of the same resolution bandwidth. If different resolution bandwidths were used for the two points, as, for example, in the case of a VSB signal that uses a pilot, the power of which must be included in the power measurement, then the appropriate factor could no longer be assumed and must be explicitly included in the calculations.

A pair of formulas that serves to relate the relevant factors follows. The formula for absolute power measurements is to be used when the average signal power is found using a separate instrument such as a power meter; the formula gives the amount by which the measured power value is to be attenuated to find the absolute power value to be used on the spectrum analyzer or equivalent instrument at the spectral point of concern. The formula for relative power measurements is to be used when the average signal power is found using the same instrument as used to measure the

attenuation at the specified spectral points and allows different resolution bandwidths to be applied to the two parts of the measurement; the formula gives the required amplitude separation (in dB) between the flat top of the (digital) signal and the point of concern. It should be noted that the relative power measurement formula yields just the attenuation required by the proposed Rules when the same resolution bandwidth is used for both measurements.

Implicit in the relationships given in the formulas is an assumption: The resolution bandwidth used for all measurements is no greater than the channel bandwidth. The power levels required at various spectral points are then expressed as ratios in dB below the absolute channel power measured independently or the flat top of the signal measured on the same instrument used to measure the spectral point power.

For absolute power measurements:

$$Attenuation\ in\ dB\ (below\ channel\ power) = A + 10\ log\left(C_{BW} / R_{Bw}\right)$$

For relative power measurements:

$$Attenuation\ in\ dB\ (below\ flat\ top) = A + 10log\left(R_{BW1} / R_{BW2}\right)$$

Where:

A= Attenuation specified for spectral point (e.g., 35, 38, 60 dB)
C_{BW} = Channel bandwidth (for absolute power measurements)
R_{BW} = Resolution bandwidth (for absolute power measurements)
R_{BW1} = Resolution bandwidth for flat top measurement (relative)
R_{BW2} = Resolution bandwidth for spectral point measurement (relative)

The methods proposed provide the flexibility in maintenance of the spectral responses of signals required in an environment in which signals of various bandwidths can be used. They relate the measurements and calculations to the spectral points and energy levels to be controlled without encumbering operations with procedures that clearly will be unworkable in at least some instances. They permit the use of instrumentation that can take advantage of the latest technology and that can be applied to modulation methods and channel plans of any sort. They are thus in keeping with the Commission's approach in the *NPRM* to provide licensees with the greatest flexibility possible consistent with control of interference.

M. The Commission Can Resolve Issues Associated With The Use Of ITFS Channels For Advanced Technologies Without Restricting Flexible Use.

As noted previously, in the interest of expediting a resolution of this proceeding the Petitioners support adoption of the proposals advanced in the compromise NIA/WCA Joint Proposal for governing the transition of ITFS channels to a flexible use regulatory environment. This joint submission demonstrates that it is possible to craft a regulatory environment that will permit the wireless cable industry to become a viable competitive force in the marketplace (which benefits both the wireless cable industry and the ITFS community), while at the same time assuring that the educational community substantially shares in the benefits of digital technology.

Although the process that led to the NIA/WCA Joint Proposal started long before the Petition was filed or *NPRM* released, the NIA/WCA Joint Proposal responds to many of the issues raised by the *NPRM* regarding the continuing role of ITFS as advanced technologies are introduced.[216/] That

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[216/] *See NPRM*, at ¶¶ 61-87.

the *NPRM* would examine those issues is not surprising, for in response to the *Public Notice* many educators submitted comments that, while supportive of the Petition, expressed concerns regarding the continuing role of ITFS licensees as complex broadband MDS/ITFS systems employing return paths, cellularization, superchannels and subchannels develop. Those concerns certainly were anticipated by the Petitioners, for they mirror in many respects concerns that were expressed by the ITFS licensees among the Petitioners during the drafting of the Petition.

Make no mistake, as MDS and ITFS licensees choose in their own discretion to combine their spectrum into systems of increasing complexity, each particular ITFS licensee (as well as each particular MDS licensee) may be called upon to integrate within a multichannel system design and, as a result, sacrifice some of the independence and individual control possible with a stand-alone analog video station. That is inevitable, at least if the commercial component of the system is to be a viable competitor in the marketplace. If the Commission denies ITFS and MDS licensees the flexibility to maximize the performance of the advanced technology system as a whole, the Commission could so cripple the multi-licensee system that it cannot compete in the marketplace. Wireless cable's competitors are not hamstrung with having to secure channel capacity from a multiplicity of licensees – if wireless cable is to succeed, the Commission must do all it can to minimize the regulatory burdens imposed as a result of the MDS/ITFS licensing system.

The NIA/WCA Joint Proposal represents a thoughtful effort to balance the desire of the educational community to enhance the ITFS as a valuable educational resource through the introduction of digital technology, while at the same time accommodating the legitimate marketplace needs of the commercial operators who will be funding the deployment of that technology. It

reflects a very basic understanding that, unless the wireless cable industry is given the regulatory freedom to respond to marketplace demands, the financial and operational support that has driven the growth of the ITFS over the past decade and a half will come to a screeching halt. No doubt, it will draw criticism from some wireless cable operators and from some members of the ITFS community; that is unavoidable when contentious industry-wide issues are resolved through compromise. The Commission should recognize, however, that the parties to the compromise, coupled with the approximately 115 Petitioners, represent by far the bulk of the wireless cable industry and the ITFS community.

As the Commission considers the issues raised by the *NPRM*, it should not forget that:

> Before the Commission permitted leasing of excess capacity, the spectrum initially allotted for ITFS was so underutilized outside metropolitan areas that the Commission reallocated two entire ITFS channel groups, or eight channels, to MMDS. With the advent of leasing, demand for ITFS channels has surged. Leasing has prompted revenue-sharing arrangements between ITFS licensees and wireless cable operators resulting not only in full use of the spectrum, but in full realization by educators of what was once only an unattainable aspiration: to become actively engaged in a technology that exposes their students to educational and interactive instructional programming previously inaccessible to them.[217/]

As the Commission is well aware, "revenues are key to this ITFS-MMDS partnership."[218/] The Commission is absolutely right when it observes that "leasing channel capacity for the transmission of commercial programming generates revenues that may be vital to the continuing operations of authorized ITFS systems, to the successful deployment in many markets of ITFS service, and to the

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[217/] *ITFS Channel Loading Order*, 9 FCC Rcd at 3364 (citations and footnotes omitted).

[218/] *Id.*

service's public interest benefits."[219/] In crafting rules to govern the relationship between ITFS licensees and wireless cable operators, the Commission cannot lose sight of the fact that a wireless operator's ability to provide revenue to its ITFS partners is directly related to its ability to compete.

Money, however, is not the only benefit that ITFS licensees enjoy as a result of their relationship with wireless cable operators; rather, they secure a wealth of new equipment, professional operational and technical support, the ability to employ new technology, and access to in-home distance learners. Particularly as advanced digital technologies are deployed, the focus of the relationship between wireless cable operators and ITFS licensees is likely to increasingly shift to the provision of the services made possible by advanced technology. For example, ITFS licensees are increasingly recognizing that the access to high-speed Internet services that a wireless cable system offers can be more valuable than lease revenues.

Yet, as the Commission considers the concerns over the future of the ITFS raised in the *NPRM*, it should also keep in mind four fundamental precepts shared by the Petitioners and largely encapsulated in the NIA/WCA Joint Proposal to protect the ITFS:

> 1. No ITFS or MDS licensee should be forced to convert to a cellularized transmission system, to employ its spectrum for return paths, or to engage in subchannelization or superchannelization without its consent;
>
> 2. Any ITFS or MDS licensee that does not desire to participate in a system employing advanced technology should be protected against interference from those that do;
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> 3. Those ITFS licensees that do take advantage of the flexibility proposed in the Petition should still be required transmit as much ITFS programming as they are required to transmit today; and

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[219/] *Id.*

4. Those ITFS licensees that lease excess capacity for digital services should share in the benefits of digital technology in the manner that best meets local educational and instructional needs.

These four underlying elements are essential to the preservation of the underlying instructional purpose of the ITFS, while at the same time allowing visionaries in the ITFS community to address their evolving needs through advanced digital technology. And, by adopting rules based upon these four concepts, the Commission can sweep away much of the regulatory underbrush that has hampered the development of relationships among wireless cable operators and ITFS licensees that maximize achievement of local educational objectives while at the same time meeting the needs of the wireless cable operator and the public.

1. The Commission Should Adopt The Provisions Of The NIA/WCA Joint Proposal Addressing The Allocation Of ITFS Channel Capacity And The Use Of That Capacity By ITFS Licensees.

a. The Commission Should Require That Each ITFS Licensee That Leases Capacity For Digital Use Either Use Or Preserve The Right To Recapture 25% Of Channel Capacity Under The Terms Of The Joint Proposal.

The Petitioners believe, as a matter of principle, that the Commission should refrain to the greatest extent possible in dictating the provisions of ITFS excess capacity leases. As is discussed below, the Petitioners believe the Commission has gone too far in the past. However, the Petitioners recognize that the Commission has historically identified some amount of channel capacity that each ITFS licensee engaged in leasing must either use or have the ability to recapture so that "the intended use of the spectrum will be preserved."[220/] Thus, Section 74.931(e) of the Commission's Rules

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[220/] *Amendment of Part 74 of the Commission's Rules and Regulations in Regard to the Instructional Television Fixed Service*, 101 F.C.C.2d 49, 87 (1985).

imposes certain minimum use and recapture requirements on ITFS licensees engaged in leasing. As the *NPRM* recognizes, however, that section was crafted in an environment where ITFS channels were primarily employed for the one-way, downstream transmission of analog NTSC video programming, and will not neatly apply once ITFS channels begin being used for a variety of uses that can be upstream or downstream, video, voice or data, analog or digital.[221/] While the Petitioners believe that the current rules should be retained for those ITFS licensees solely engaged in the transmission of downstream analog programming (assuming adoption of the clarifications proposed in the Petition),[222/] the Petitioners endorse adoption of the provisions of the NIA/WCA Joint Proposal

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[221/] *See NPRM*, at ¶¶ 65-69.

[222/] The *NPRM* seeks comment "from ITFS licensees" on a proposal by the Petitioners that Sections 74.931(e)(2) and (9) be revised to clarify that an ITFS licensee engaged in analog-based channel mapping or channel loading need only preserve for ready recapture an amount of airtime per channel equal to 40 hours less the number of hours actually employed for ITFS transmissions. *See* Petition, at Appendix B, p. 41. As noted in the Petition, the Commission historically had required ITFS licensees engaged in leasing of excess capacity to preserve at least 40 hours each week per channel for the transmission of ITFS programming. This 40-hour preservation could consist of any combination of airtime actually used to transmit ITFS programming and airtime subject to ready recapture, provided that the minimum actual use requirements of §§74.931(e)(2) and (3) are met. Thus, for example, an ITFS licensee that actually transmitted thirty hours per channel per week of ITFS programming was only required to reserve for ready recapture an additional ten hours. When the Commission amended §74.931(e)(2) in its 1994 *Report and Order* in MM Docket No. 93-106, it revised that subsection in a manner that appears to require the preservation of 20 hours per week per channel of ready recapture time when leasing to a wireless cable operator, even if the ITFS licensee is actually transmitting more than the 20 hours per channel per week ITFS programming minimum. However, that change appears to have been inadvertent at the time -- there is nothing in the *Report and Order* to suggest that the Commission intended to alter its historic policies regarding the amount of ready recapture time that must be made available to those ITFS licensees that actually utilize more than the 20-hour minimum. *See* Petition of Wireless Cable Ass'n Int'l for Reconsideration and Clarification, MM Docket No. 93-106, at 21-23 (filed Aug. 12, 1994)[hereinafter cited as "WCA Channel Loading Reconsideration Petition"]. Indeed, the fact that §74.931(e)(1) does not require the retention of 20 hours for recapture where more than 20 hours is used by an ITFS licensee that leases for non-wireless cable operations is further evidence that the

to govern those ITFS licensees that lease excess capacity in whole or in part for digital applications.[223/]

The lynchpin of the NIA/WCA Joint Proposal, and by far the most contentious element during the discussions that led to the compromise, is the provision which mandates that each ITFS licensee engaged in digital leasing retain, at a minimum, 25% of the capacity of its channels for

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20 recapture requirement was the inadvertent result of revising subsections (2) and (9) to accommodate channel loading. To eliminate any confusion, the Petitioners suggested that §74.931(e)(2) be revised to provide that an ITFS licensee need only preserve for ready recapture an amount of airtime per channel equal to 40 hours less the number of hours actually employed for ITFS transmissions. Similar conforming changes to §74.931(e)(9) were also proposed.

Notwithstanding Paragraph 66 of the *NPRM*, the Petitioners, which include more than 60 ITFS licensees, reiterate their support for this revision. It makes absolutely no sense for the Commission to provide, in effect, that no matter how much airtime an ITFS licensee is using, it must always reserve the right to recapture at least 20 additional hours when leasing to a wireless cable operator. While the Petitioners acknowledge that there should be some absolute quantity of time set aside for educational use (*i.e.*, 40 hours), permitting unlimited recapture ignores the economic and operational realities of the wireless cable industry. Between the *Report and Order* and Paragraph 66, the Commission may have created an environment under which an ITFS licensee in theory can ignore its contractual commitments and continually recapture 20 hours of airtime until no airtime is left to be recaptured (and none available for use by the wireless cable operators). Suffice it to say that the investment community will be loathed to fund the continued expansion of ITFS and the introduction of advanced technologies unless and until the Commission clarifies that, absent a contractual agreement entitling the ITFS licensee to greater recapture rights, each ITFS licensee only has the right to recapture the difference between 40 hours per channel and the number of hours it is actually using.

[223/] The *NPRM* seeks comment on whether "there [should] be different rules depending on whether the wireless cable system employs digital transmissions?" NPRM, at ¶ 68. Although reasonable people can argue as to whether the Commission's minimum use and recapture requirements should be increased because digital technology allows compression techniques that effectively expand the capacity to transmit video programming, there is no question that when the digital technology is employed to transmit programming other than traditional ITFS video programming, the current rules must at a minimum be revised to reflect that "hours per channel" is no longer an appropriate mechanism for measuring all ITFS usage.

immediate use or for recapture.[224/] Of course, each ITFS licensee has the right to negotiate to retain access to as much capacity as it desires. However, at a bare minimum, each ITFS licensee under the NIA/WCA Joint Proposal will have access to 25% of the capacity of its channels.[225/] The magnitude

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[224/] The *NPRM* inquires "how should any increased requirements be measured, e.g., additional hours or additional paths?" *NPRM,* at ¶ 68. It may be that neither of these alternatives is appropriate where, for example, the ITFS licensee is using its capacity for high speed Internet access or when the system employs statistical multiplexing techniques to dynamically control compression ratios. Thus, the Petitioners agree with NIA and WCA that it is best to express these requirements in terms of percentage of capacity. Admittedly, this is a somewhat imprecise measure. However, because the methodology for calculating percentages of system capacity will necessarily vary depending upon system design and the types of services that will be offered, the Commission should defer to good faith efforts by the ITFS licensee to comply with requirements relating to the reservation and use of mandatory ITFS capacity, at least until further experience is gathered. Any effort by the Commission at this early juncture to establish a specific method for measuring compliance would likely have the unintended consequence of skewing usage towards one service offering and away from another (that could better serve the public interest). Once additional experience is garnered with the uses that ITFS licensees make of advanced digital technologies, the Commission then in a future rulemaking consider whether a more structured mechanism for measuring compliance is required. Until then, the Commission should promote efforts by ITFS licensees and wireless cable operators to develop mechanisms for measuring compliance with the proposed percentage requirements and should permit consideration of video, voice and data uses, provided they are reasonably capable of being measured. While the Petitioners suspect that the *NPRM* was correct in concluding that "counting uplink transmissions will be overly complicated and impractical" (*see NPRM* at ¶ 69), the Commission should not deter efforts to permit consideration of such transmissions.

[225/] The *NPRM* inquires as to whether "time-of-day requirements" should be imposed to ensure that the uses being counted are appropriate. *See NPRM,* at ¶ 69. The Petitioners strongly oppose the imposition of any such requirement. In its *Order on Reconsideration* in General Docket No. 90-54, the Commission repealed its former requirement that only programming transmitted between 8:00 am and 10:00 pm, Monday through Saturday, could be applied towards the substantial use requirements of Section 74.931. *See Gen. Docket No. 90-54 Order on Reconsideration,* 6 FCC Rcd at 6774. The record before the Commission at that time established, beyond peradventure, that there were a variety of legitimate uses of ITFS outside of those hours. There is no evidence that the flexibility afforded ITFS licensees has been abused in any manner since. As the more advanced uses of ITFS become possible, the likelihood of use during non-traditional hours increases. For example, students at colleges and universities have been known to study at unusual hours, so the possibility that an ITFS licensee's high-speed Internet access will be utilized for *bona fide* educational research